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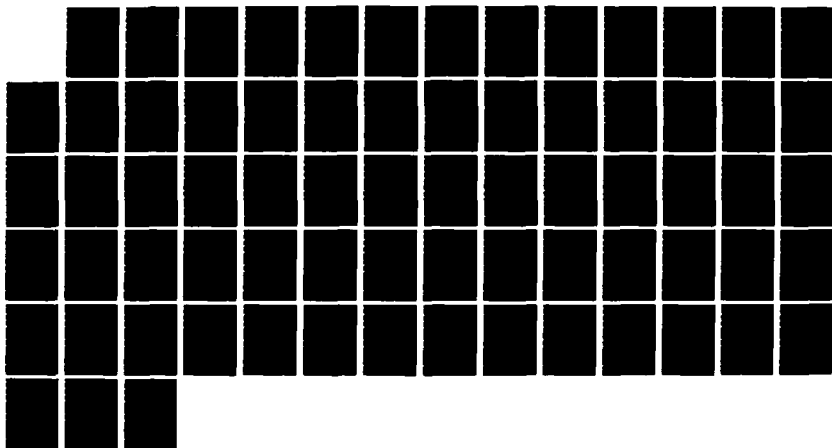
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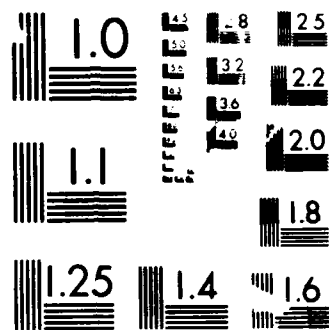
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A LONGITUDINAL STUDY OF THE RELATIONSHIP
BETWEEN SITUATIONAL CONSTRAINTS AND JOB
PERFORMANCE IN A UNITED STATES MINT

THESIS

Mark S. Richardson
Captain, USAF

AFIT/GLM/LSR/87S-59

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A LONGITUDINAL STUDY OF THE RELATIONSHIP BETWEEN
SITUATIONAL CONSTRAINTS AND JOB PERFORMANCE
IN A UNITED STATES MINT

THESIS

Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology
Air University
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Logistics Management

Mark S. Richardson, B.S., M.B.A.

Captain, USAF

September 1987

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Abstract

This research was conducted to determine if there were any significant relationships between concomitant measures of situational constraints and (1) job performance; (2) work attitudes; and (3) behavioral intentions to quit for a sample of employees from a United States Mint. This research also investigated predictive relationships between situational constraints and outcome measures over a fourteen-month period. Survey and performance appraisal data were collected from a sample of 260 United States Federal Mint employees in three waves: Wave 1 during November 1983; Wave 2 at the end of May 1984; and Wave 3 during January 1985.

This study found no significant relationships between situational constraints and self-appraisal ratings. Significant relationships, however, were found between constraints and supervisory performance ratings. Overall, the study did not observe a conclusive constraints - affective measures relationship. No significant connection between situational constraints and behavioral intentions to quit were found in the study. While this study's longitudinal data revealed little evidence of longitudinal predictability of performance by constraints, the author

recommends the study's longitudinal design be used in future studies. The longitudinal design would enable researchers to draw inferences concerning the causal effects of constraints on subsequent outcome measures.

A LONGITUDINAL STUDY OF THE RELATIONSHIP BETWEEN
SITUATIONAL CONSTRAINTS AND JOB PERFORMANCE
IN A UNITED STATES MINT

I. Introduction

Background

Researchers have attempted to identify various determinants of job performance. The influence of human abilities (Dunnette, 1976) and motivation (Campbell & Pritchard, 1976) on work performance has historically received a great deal of attention. Most research treated situational constraints as impacts on motivation. However, in their review of motivational research, Campbell and Pritchard (1976) included "facilitating and inhibiting conditions not under the control of the individual" as a hypothesized partial determinant of performance (Peters, O'Connor & Rudolf, 1980).

Situational constraints have been viewed as an influence on job performance in many studies (e.g. Blumberg & Pringle, 1982; Campbell & Pritchard, 1976; Dachler & Mobley, 1979; Ilgen, Fisher & Taylor, 1979; Schneider, 1978; Wherry & Bartlett, 1982).

Laboratory Studies

Even though several conceptual models recognized work situations directly affect job performance, the hypothesized direct effect of facilitative/inhibiting situational variables on performance was not tested until 1980 (Peters et al., 1980). Peters et al. (1980) tested the assumed impact of situational characteristics on both affective and behavioral work outcomes. Prior to the actual study of affect, Peters et al. (1980) realized the necessity of first defining the domain of situational constraints directly affecting work outcomes. By using a study of 62 full-time Dallas business community employees, Peters et al. (1980) developed a situational taxonomy of eight specific and performance-relevant situational variables. The individuals were asked to respond to an open-ended questionnaire. Each participant described instances when situational conditions interfered with their job performance. The participants also described their affective responses to the negative situations. The responses to the questionnaire were summarized and sorted focusing on specific performance-relevant situational variables. The resulting taxonomy included: (1) job-related information, (2) tools and equipment, (3) materials and supplies, (4) budgetary support, (5) required services and help from others, (6) task preparation, (7) time availability, and (8) work environment (Peters et al., 1980).

Peters et al. (1980) used a controlled laboratory experiment to test their hypothesis. Four of the eight situational variables were manipulated to create facilitating and inhibiting conditions. Performance was found to be lower for individuals working in the inhibiting condition. Individuals had also been grouped according to low and high performance. Both types of groups were subjected to the manipulated situational conditions. Both low and high performers in the facilitating condition performed significantly better than the low and high performers in the inhibiting condition. Individuals in the facilitating condition reported significantly less frustration and were more satisfied with their task than the individuals in the inhibiting condition. The results indicated performance, affective responses, and the relationship between the two were affected by performance-relevant situational constraints (Peters et al., 1980).

Peters and O'Connor (1980) laid the conceptual groundwork for research into the direct effect of situational constraints on performance. Their article presented 'a conceptual framework specifying the hypothesized influences of situational constraints on work outcomes and individual difference to work outcome associations' (Peters & O'Connor, 1980, p. 391). Peters and O'Connor (1980) suggested further research be aimed at examining the completeness of their taxonomy as well as the development of a sound measure of situational constraints useful for field research.

Peters, Fisher, and O'Connor (1982) investigated the presence of a moderating effect for situational control of performance variance on the relationship between individual differences and performance. Peters et al. (1982) used a field experimental simulation to test their hypothesis. The situational conditions of amount and distribution of work to be accomplished in a given time period were manipulated. Two individual difference variables, abilities and past experience, were also evaluated. The results of the study indicated situational constraints have an effect on the predictability of performance by relevant individual differences. The study concluded that performance was better predicted by task ability and experience when performance conditions displayed lower situational constraints.

A laboratory study manipulating three of the original eight situational constraint variables studied by Peters et al. (1980) was conducted by Peters, Chassie, Lindholm, O'Conner, and Kline (1982). The study created facilitating and inhibiting conditions and found higher performance in the lower constraint condition than in the higher constraint condition. The study also found less frustration and dissatisfaction among the lower constraint individuals (Peters, Chassie et al., 1982).

The laboratory studies indicate inhibiting situational constraints are related to lower job performance. These

inhibiting constraints have also been found to have a negative effect on affective responses.

Field Studies -- Private Sector

Several field studies in the private sector (e.g. O'Conner, Peters, Rudolf & Pooyan, 1982; O'Conner, Peters, Pooyan, Weekly, Frank, & Erenkrantz, 1984; Steel & Mento, 1986a; Steel, Mento, & Hendrix, 1987) have not yielded consistent results. Peters, O'Connor, and Eulberg (1985) examined much of the field research on situational constraints and concluded the field research does not fully agree with the laboratory findings.

O'Conner et al. (1982) conducted research on the relationship of situational constraints and affective outcomes. The study included managers and non-managers from different jobs, levels, and organizations. Situational constraints were measured from employee responses to questionnaires based on the eight sources of constraints identified by Peters et al. (1980). The eight resource dimensions were combined to provide an average constraint score. This measure permitted employees to exclude constraint variables which they deemed irrelevant to their specific job situation.

The study found situational constraints to be significantly associated with frustration ($r = .49$, $p < .001$). Measures of dissatisfaction were also significantly related to overall job constraints (r 's ranged from $-.26$, $p < .001$

for pay satisfaction to $-.42$, $p < .001$ for supervisory satisfaction).

O'Conner, Peters et al. (1984) conducted field research using the framework presented by Peters and O'Conner (1980) to test the impact of situational constraints on performance, affective outcomes, and turnover. Performance appraisals were filled out for participating individuals by their immediate supervisors. This study used a large sample size ($N = 1450$) drawn from three levels in the same convenience store organization. The three levels included: store managers, supervisors, and district managers. Since the workers were from the same organization, specific measures of constraints and performance were developed. The results concurred with laboratory research by finding higher situational constraints associated with lower performance ($r = -.12$, $p < .001$). Although significant, the constraint-performance association was smaller than expected. The authors offered a reason for the lower magnitude, this may be due to

...the fact that the constraints observed during the current research were typically not severe enough to produce substantive reductions in performance (O'Conner, Peters et al., 1984, p. 670).

Higher situational constraints were also related to higher frustration ($r = .36$, $p < .001$) and three measures of lower satisfaction: general ($r = -.28$, $p < .001$); with work ($r = -.33$, $p < .001$); and with supervision ($r = -.40$, $p < .001$). In addition, the study found a weaker than expected

the mean, partitioning the sample into low and high constraint performance environments.

Steel and Mento (1986a) found that constraints were significantly negatively correlated with the supervisory appraisals ($r = -.36$, $p < .001$) and FBSA ratings ($r = -.31$, $p < .001$). This finding contrasted with earlier field studies (O'Connor, Eulberg, Peters, & Watson, 1984; O'Conner, Peters et al., 1984). The Steel and Mento (1986) study, however, agrees with earlier research in finding very modest relationships for situational constraints and objective performance criteria (r 's = .00 to $-.12$, $p < .05$).

The effects of situational constraints on the work performance of finance company cashiers was investigated by Steel, Mento, and Hendrix (1987). The study used 368 cashiers from a large midwestern finance company. The cashiers' job performance was measured by supervisory and self-appraisals (FBSAs), as well as, with objective criteria.

Steel et al., (1987) found that supervisory ratings and self-ratings of performance were significantly correlated with the constraint ratings with r 's = $-.44$ ($p < .001$) and $-.23$ ($p < .001$), respectively. Significant negative correlations were also obtained between objective performance measures and one constraint dimension, social constraints ($r = .12$, $p < .05$, for cash overages and $r = .11$, $p < .05$, for cash shortages). The results closely resemble earlier findings using similar sets of performance criteria (Steel &

Mento, 1986a). Performance variance was not found to be significantly greater in low constraint work settings than in high constraint work settings (Steel et al., 1987). The failure to find differences in performance variance between the two groups from high and low constraint settings agreed with earlier findings (O'Conner, Eulberg et al., 1984; Peters et al., 1980).

Field Studies -- Federal Sector

Private sector organizations are not the sole source of research information. Situational constraints can also be found among various agencies and branches of the United States Government. The federal government is a complex bureaucracy with a high degree of formalization and elaborate detailed controls. Government workers are frequently depicted as working in a sea of red tape which limits flexibility and restricts the straight-forward accomplishment of tasks. Several studies in the federal sector (e.g. O'Connor, Eulberg, Peters, & Watson, 1984; Olson & Borman, 1985; Olson, Borman, & Motowidlo, 1986; Steel & Mento, 1986b) have observed relationships between situational constraints and job performance.

The Air Force Human Resources Laboratory (AFHRL) sponsored research on situational constraints in the Air Force (O'Conner, Eulberg et al., 1984). The study was accomplished in four phases.

In the first phase situational constraints experienced by first and second-term, skilled and semi-skilled, enlisted personnel in Air Force work environments were identified. Using the procedure described by Peters et al. (1980), 14 categories were identified. The situational constraint dimensions were: (1) training; (2) materials & supplies; (3) time; (4) tools & equipment; (5) planning/scheduling of activity; (6) cooperation from others; (7) personnel; (8) physical working conditions; (9) policies & procedures; (10) red tape; (11) transportation; (12) job relevant authority; (13) job related information; and (14) forms (O'Connor, Eulberg et al., 1984).

Phase II of the AFHRL study developed a 57-item multiple choice questionnaire using the situational constraint dimensions from Phase I. This phase also sought empirical verification of the constraint scale developed in the first phase. Each of the constraint dimensions significantly correlated with various relevant criterion measures. The results of this phase validated the usefulness of the constraint dimensions and constraint scale for investigating the impact of situational constraints on Air Force enlisted work performance (O'Connor, Eulberg et al., 1984).

Phases III and IV used the questionnaire to investigate the impact of situational constraints on performance, affective responses, and propensity to leave the work setting. Phase III data were obtained from pairs of

enlisted personnel and their supervisors in six occupational specialties: (1) Aircraft Pseudraulic Systems Mechanic (AFS 423X4); (2) Fire Protection Specialist (AFS 571X0); (3) Fuel Specialist (AFS 631X0); (4) Material Facilities Specialist (AFS 645X1); (5) Personnel Specialist (AFS 732X0); and (6) Law Enforcement Specialist (AFS 811X0). Phase IV data were obtained from enlisted personnel and their supervisors in the Medical Specialist (AFS 902X0) occupational specialty. The seven occupational specialties in Phase III and Phase IV were administered the same questionnaire simultaneously.

The study hypothesized that situational constraints would relate to performance, affective reactions, and the propensity to stay/leave. The results of the study did not meet expectations concerning the relationship of situational constraints to performance outcomes.

For each AFS, 56 potentially significant associations were investigated between the constraint dimensions and performance. The numbers of significant [$p < .05$ or stronger] constraint dimension to performance correlations observed for each AFS were (a) AFS 423X4 = 12 [r's ranged from .22 to .34], (b) AFS 571X0 = 0, (c) AFS 631X0 = 0, (d) AFS 645X1 = 20 [r's ranged from .19 to .38], (e) AFS 732X0 = 3 [r's ranged from .23 to .26], (f) AFS 811X0 = 10 [r's ranged from .16 to .24], and (g) AFS 902X0 = 3 [r's ranged from .11 to .14]. (O'Connor, Eulberg et al., 1984, p. 34).

Similarly, little evidence was found to support a relationship between constraints and two propensity to stay/leave measures (reenlistment likelihood [14 out of 56 possible significant associations with r's ranging from .16 to .33, $p < .05$ or stronger] and reenlistment intentions [9

out of 56 possible significant associations with r 's ranging from .12 to .34, $p < .05$ or stronger]).

O'Connor, Eulberg et al. (1984) did find consistent relationships between constraint measures and affective outcomes across all occupational specialties. Personnel with higher levels of total and overall situational constraints generally had greater frustration and lower satisfaction with r 's ranging from .10 to .75 ($p < .05$ or stronger) for satisfaction and from .17 to .53 ($p < .05$ or stronger) for frustration (O'Connor, Eulberg et al., 1984).

Olson and Borman (1985) conducted research on the relationship of environmental factors (i.e., constraints) and performance for Army enlisted personnel. The study used a sample containing 800 first-term enlisted personnel from five Army military occupational specialties. The Army Work Environment Questionnaire was used to measure 14 dimensions of the Army work environment. Job performance criteria used supervisory and peer ratings. Behaviorally-anchored rating scales were used to measure job-specific and Army-wide components of performance.

The study found the largest correlations (r 's ranged from .08 to .23, $p < .05$) between environmental variables and Army-wide BARS performance measures. Specifically, the significant correlations with performance were found for the total sample with environmental variables of: (1) perceived job importance (r 's = .09 to .23, $p < .05$); (2) discipline practices (r 's = .08 to .14, $p < .05$); (3) individual

support (r 's = .09 to .18, $p < .05$); and (4) the reward system (r 's = .08 to .11, $p < .05$). Environmental variables of: (1) resources; (2) workload; (3) physical working conditions; and (4) changes in job procedures were not significantly associated with job performance. The relationships observed between the environmental variables and Army-wide BARS performance measures were consistent whether performance was measured by supervisors or peers (Olson & Borman, 1985).

Olson et al. (1986) continued the examination of the relationship between the Army work environment and job performance. The study used a sample of 5080 first-term Army enlisted personnel in 9 different military occupational specialties. Work environment was measured using a revised Army Work Environment Questionnaire. The questionnaire measured the environmental dimensions of: (1) resources/tools/equipment; (2) support; (3) training/work assignment; (4) job importance; and (5) cooperation/cohesiveness. Performance was measured by the soldier's supervisor and peers. Performance was measured using Army-wide and job-specific behavior-based rating scales.

The study found significant correlations between the environmental variables and the performance measures. Correlations ranged from: (1) .05 to .14 ($p < .05$) for resources; (2) .17 to .24 ($p < .05$) for support; (3) .06 to .07 ($p < .05$) for training; (4) .16 to .20 ($p < .05$) for job

importance; and (5) .09 to .12 ($p < .05$) for cooperation/cohesiveness (Olson et al., 1986).

Steel and Mento (1986b) studied the effect of situational constraints on performance measures, affective measures, and withdrawal intentions within Air Force task environments. The study used a sample of 274 employees of a USAF base level civil engineering organization. Four situational constraint items including: (1) job-induced obstacles; (2) interpersonal or social obstacles; (3) physical job environment; and (4) organizational policies/procedures; were measured. The situational constraints ratings were provided by the immediate supervisor of the participating individuals. The supervisors also provided one of the two performance ratings. The other performance rating was an employee self-appraisal. The study also measured affective measures of: job satisfaction, organizational commitment, and job involvement.

The study found only one significant relationship with situational constraints, that of job satisfaction ($r = -.14$, $p < .05$). Situational constraints were not significantly related to either performance rating. The study also found no significant relationship between situational constraints and withdrawal intentions (Steel & Mento, 1986b).

Comparison of Field Studies

In their review of the literature, Peters et al. (1985) found that research into the relationship of situational constraints and performance has found mixed results. Laboratory studies (e.g. Peters et al., 1980; Peters, Chassie et al., 1982) and some field studies (e.g. O'Connor, Peters et al., 1984; Steel & Mento, 1986a; Steel et al., 1987) in the private sector have found significant relationships between situational constraints and job performance. Federal sector field research has found both no significant relationship (O'Connor, Eulberg et al., 1984; Steel & Mento, 1986b) and significant relationships (Olson & Borman, 1985; Olson et al., 1986) between job performance and situational constraints. Even though the strength of the relationships has differed from study to study, the majority of field studies (private and public sector) have generally found a relationship between work performance and situational constraints. Little evidence has supported Peters and O'Conner's (1980) prediction that performance variance would be less in higher constraining work settings than in low constraint settings.

Unlike the constraints - performance relationship, Peters et al. (1985) found constraints - affective variables relationships to be consistent from study to study. The majority of the studies in both the private and federal sectors found significant relationships between situational constraints and affective variables. Most studies have

found lower frustration and higher job satisfaction among groups with lower performance constraints.

Situational constraints can have an impact on individuals' withdrawal intentions. Because situational constraints are related to negative affective variables, and affective reactions have been shown to be predictors of withdrawal, Peters et al. (1985) concluded constraints influenced employee turnover. Results in this area have also been mixed. In their private sector field study, O'Connor, Peters et al. (1984) found a weak, though significant, relationship between constraints and actual turnover among convenience store managers. Federal sector field studies in this area (O'Connor, Eulberg et al., 1984; Steel & Mento, 1986b) found no significant relationships between situational constraints and expressed intentions to leave.

Peters et al. (1985) examined the literature concerning the consequences of situational constraints for three general areas: (1) job performance; (2) affective responses; and (3) withdrawal intentions. The present study adds to the situational constraints literature on these three issues. This present study also furthers federal sector research into these three types of outcomes by examining data from a sample of United States Federal Mint employees.

Statement of Problem

Peters and O'Conner (1980) discussed the necessity for research into the effect of situational variables on performance outcomes. Field research into the relationship between situational constraints and work performance ratings has been rather limited. The results of previous research do not show consistent agreement between laboratory and field studies. O'Conner et al. (1984) recommended the use of additional measures of performance and constraints to clarify the impact of situational constraints in organizational settings. The problem is to determine if there is a significant relationship between situational constraints and work performance for a different sample and setting than that studied in previous research. A second problem requires determining if there is a significant relationship between situational constraints and measures of work attitudes. A third problem is to determine if there is a significant relationship between situational constraints and behavioral intentions to quit or stay.

Prior research on the relationship between situational variables and performance has been exclusively limited to cross-sectional designs. Past research has failed to demonstrate the ability of situational constraints to predict subsequent work performance.

The fourth problem is to examine predictive relationships between situational constraints and job performance utilizing a longitudinal design.

Objectives and Hypotheses

The primary objective of this research is to determine if there are any significant relationships between concomitant measures of situational constraints and (1) job performance; (2) work attitudes; and (3) behavioral intents for a sample of employees from a United States Mint.

A secondary objective of the research is to determine if predictive relationships over time pertain between situational constraints and the outcome measures over a fourteen-month period.

The primary and secondary objectives were investigated through tests of the following hypotheses:

Hypothesis 1. Situational constraint ratings will be significantly correlated with measures of Mint employee performance during each of three waves of data.

Hypothesis 2. Situational constraint ratings will be significantly correlated with measures of work attitudes during each wave of data.

Hypothesis 3. Situational constraint ratings will be significantly correlated with a measure of behavioral intentions during each wave of data.

Hypothesis 4. Situational constraint ratings collected during a prior wave of data will significantly predict measures of (1) job perfor-

mance; (2) work attitudes; and (3) behavioral intentions to quit collected in subsequent waves of data.

II. Method

Sample and Setting

This study used data collected from 260 United States Federal Mint employees. Survey and performance appraisal data were collected on all participants in three waves: Wave 1 data during November 1983; Wave 2 at the end of May 1984; and Wave 3 during January 1985. In the initial wave, data were provided by 234 participating individuals. Demographic data indicated the majority (70%) of the respondents were civil service wage grade personnel. General schedule civil service employees accounted for 18 percent of the participants. The remaining 12 percent of the sample were undesignated. The sample included 44 supervisory personnel. The typical employee was a male (92%), between 41 and 50 years of age, and had a length of service between 24 and 36 months (Steel, Jennings, & Lindsey, 1987).

Measures

Data used in this study were collected from surveys given to the participating employees and their immediate supervisors. This study examined the relationship between six measures divided among four areas. The measures included: (1) situational constraints; (2) two performance measures (supervisor's performance rating and self-appraised

performance); (3) two affective measures (job satisfaction and organizational commitment); and (4) intention to quit.

Situational constraints. The employees' immediate supervisors rated the performance obstacles and constraints employees encountered in their work that inhibited performance. Situational constraints were measured with four Likert-type items (Appendix A). Item 1 measured job induced constraints. This item accounted for factors in the make-up of the job itself that determine levels of performance. The second item measured interpersonal or social obstacles. This second item represented the communication and cooperation climate among individuals who interact with the employee in the course of his/her job. The third item concerned environmental obstacles. Item three measured factors in the physical job environment and in the geographical locale of the work (e.g., sales potential) that effect job performance. The fourth item measured administrative or policy constraints. This final item concerned the rules, regulations, and requirements imposed upon the employee, by the Mint or other government agencies, that impede the employee's job performance to a greater extent than other employees doing comparable work. The instructions asked the supervisor to indicate how frequently each of the four items posed a problem for the particular employee. These instructions are reproduced verbatim in Steel and Mento (1986a). The four items were scaled on a seven-point frequency response scale. The scale ranged from (1) never a problem

to (7) always a problem. This survey instrument has previously yielded reliability estimates of $r_{xx} = .70$ (Steel & Mento, 1986a) and $r_{xx} = .67$ (Steel et al., 1987). The four items were summed to obtain a total situational constraint score for each employee ($M = 9.87$, $SD = 4.47$, $r_{xx} = .84$).

Supervisor's performance rating. The immediate supervisor of each participating employee was asked to provide a performance evaluation. Supervisors rated each employee's job performance on five aspects of work performance. The supervisor's rating of performance was performed on five Likert-type items (Appendix B). One item measured the quantity of output. This item described the productivity of an employee in terms of units of work produced or services rendered. The second item measured the quality of work performed. This item represented the degree to which work products were free of error and conformed to specifications. The third item measured the efficiency of work in terms of the degree to which resources were used to the maximum capacity with minimum waste. The fourth item measured the employee's problem-solving capacity. The definition of this item was in terms of the ability of the employee to anticipate potential problems and either prevent or minimize the problem's effect upon the employee's work unit. The fifth item measured the adaptability/flexibility of the employee adjusting to and performing in special circumstances or less than optimal conditions.

The instructions on the supervisor's rating form asked the supervisor to rate the worker's performance compared to the performance of other employees doing similar work. Each item was scaled on a seven-point comparative response scale. The scale ranged from (1) far worse to (7) far better than other employees. The five items were summed to obtain a total supervisory performance rating ($M = 20.25$, $SD = 5.06$). Steel and Mento (1986a) and Steel et. al. (1987) found this measure to be a valid predictor of employee job performance for samples of finance company branch managers and cashiers, respectively. The coefficient alpha for this measure in the present study was .93.

Self-appraisal of performance. The second source of subjective performance ratings was solicited from the participating employees themselves. This measure of performance was based on Feedback Based Self-Appraisal (FBSA). Steel and Ovalle (1984a) found FBSAs heightened the agreement between supervisory and employee performance appraisals. The employees were asked to give responses about their performance based on feedback received from their supervisor about their performance. The FBSA ratings were made on the same five areas as in the supervisor's rating form and used the same seven-point rating scale (Appendix C). Employees, like their supervisors, were asked to indicate how their job performance would compare with other employees doing similar work. Like the supervisor's performance rating, the 5 items were summed to obtain a

total self-appraisal performance rating ($M = 19.87$, $SD = 5.04$). The internal consistency reliability estimate for this measure was .92.

Job satisfaction. Job satisfaction, an affective criterion, was measured with a five item scale developed by Andrews and Withey (1976). The participating employees were asked to what degree they were satisfied with various aspects of their job. The items (Appendix D) asked how the employees felt about: (1) their job (e.g. How do you feel about your job?); (2) their co-workers; (3) the work itself; (4) the physical surroundings, hours, and amount of work; and (5) provisions available for doing their job (e.g. equipment, information, and good supervision). The items in this instrument were measured on a seven-point scale ranging from (1) terrible to (7) delighted. The five items were summed to form a single job satisfaction rating ($M = 18.17$, $SD = 4.79$). Steel et al. (1987) and Steel, Mento, Dilla, Ovalle, and Lloyd (1985) reported reliabilities for this instrument of .77 and .78, respectively. The alpha coefficient calculated from analysis of the present study's data was .77.

Organizational commitment. An additional affective measure used in this study was the Organizational Commitment Questionnaire (Mowday, Steers, & Porter, 1979). This survey instrument measured the sense of loyalty and commitment of participating employees toward the Mint. The questionnaire contained fifteen items (Appendix E) representing possible

feelings the employees might have had about the Mint. Typical examples of the items included: "I am willing to put in a great deal of effort beyond that normally expected in order to help this organization be successful;" "I would accept almost any type job assignment in order to keep working for this organization;" and "I am proud to tell others that I am part of this organization." The employees were asked to respond to each statement using ratings between (1) strongly disagree and (7) strongly agree. Steel and Mento (1986b) used this instrument and obtained an internal consistency reliability estimate of .87. Mowday et al. (1979) cite extensive reliability and validity for this measure including: alpha coefficients ranging from .82 to .93; test-retest reliabilities ranging from .52 to .75; convergent validities ranging from .63 to .74 across six diverse samples; and discriminant validities ranging from $r = .30$ to $.56$ with job involvement, $r = .01$ to $.68$ with the Job Descriptive Index (JDI), and $r = .39$ to $.40$ with career satisfaction. The fifteen items of the instrument in this study were summed and a total organizational commitment score was calculated for each employee ($M = 48.11$, $SD = 18.86$, $r_{xx} = .88$).

· Intention to quit. Steel and Ovalle (1984b) found behavioral intentions to quit or remain to be primary motivational antecedents of plans to withdraw. Survey responses to an item measuring intent to remain in federal service were used as an index of withdrawal plans. The item

(Appendix F) used had five possible responses ranging from (1) I definitely intend to separate within the coming year to (5) I definitely intend to remain during the coming year.

Procedure

Survey questionnaires were administered to participating employees on-site in group meetings. Respondents were notified by a research staff member that their participation was strictly voluntary and also that their responses would remain confidential and anonymous. The response rate for the study was approximately 83% (i.e., 260 of the total of 313 employees in the organization).

The supervisory performance appraisals and constraint ratings were collected at the same time the survey questionnaires were administered. The supervisors were informed their appraisals would be used exclusively for research purposes only. The appraisal ratings were available on 221 of the cases.

III. Results

Descriptive Statistics from the Survey and Appraisal Data

Three Waves of survey and appraisal data were collected from the participants. Wave 2 data were collected six months after the initial Wave 1 data. Wave 3 data were collected approximately 14 months after Wave 1 data. The means and standard deviations for each wave of data are presented in Table 1. Complete sets of data were not available from each of the original participants because participation in each wave was voluntary.

Cross-Sectional Correlates of Situational Constraints

The cross-sectional outcome correlates of the situational performance constraint variable are shown in Table 2 for Wave 1. All of the constraints - outcome correlations were low. One significant correlation was obtained between the constraints and supervisory performance rating ($r = -.29, p < .001$). This relationship supports the hypothesized relationship between job performance and situational constraints in the work environment. However, this relationship was not replicated by the self-appraisal performance rating measure. Contrary to prediction, responses to the affective measures were not significantly correlated with the situational constraints variable. The intention to

TABLE 1
Means and Standard Deviations for Measures

Variable	N	M	SD
Wave 1			
Situational Constraints	204	9.87	4.47
Supervisory Performance rating	221	20.25	5.06
Self-Appraisal rating	233	19.87	5.04
Job satisfaction	235	18.17	4.79
Organizational commitment	234	48.11	18.36
Intent to quit	229	0.95	1.19
Wave 2			
Situational Constraints	162	11.51	4.45
Supervisory Performance rating	163	20.07	4.63
Self-Appraisal rating	160	19.44	4.91
Job satisfaction	159	17.77	4.51
Organizational commitment	154	44.31	18.29
Intent to quit	157	1.22	1.35
Wave 3			
Situational Constraints	196	10.34	5.19
Supervisory Performance rating	211	21.47	4.97
Self-Appraisal rating	131	19.55	4.91
Job satisfaction	131	17.66	5.77
Organizational commitment	129	44.48	20.05
Intent to quit	129	1.24	1.34

TABLE 2

Cross-Sectional Outcome Correlates of Wave 1
Situational Performance Constraints

Variable	r
Supervisory Performance Rating	-.29***
Self-Appraisal Rating	-.02
Job satisfaction	.01
Organizational commitment	-.07
Intent to quit	.07

*** p < .001

quit variable also failed to show a significant relationship with situational performance constraints.

Table 3 shows comparable cross-sectional correlations between measures of constraints and various outcome measures collected in Wave 2. No statistically significant relationships were found within the Wave 2 data. Unlike Wave 1 data, the supervisory performance rating was not related to the constraint rating. As found in Wave 1 data, the self-appraisal performance ratings were unrelated to constraints. Responses to both affective measures and the withdrawal criterion showed no significant correlation with the situational constraint variable in Wave 2, as was the case in Wave 1.

Wave 3 cross-sectional outcome correlates of constraints are shown in Table 4. Supervisory performance ratings were significantly correlated with the constraints measure ($r = -.28, p < .001$). This relationship agrees with the relationship found in the Wave 1 data. The data in Wave 3, like the data in Waves 1 and 2, failed to yield significant correlation between the constraint variable and the self-appraisal performance rating. A significant relationship between organizational commitment and the performance constraint variable was found in the Wave 3 data ($r = -.26, p < .01$). This relationship indicates that organizational commitment is lower when situational performance constraints are present. The other affective variable, job satisfac-

TABLE 3

Cross-Sectional Outcome Correlates of Wave 2
Situational Performance Constraints

Variable	r
Supervisory Performance Rating	-.15
Self-Appraisal Rating	-.14
Job satisfaction	-.07
Organizational commitment	-.11
Intent to quit	.03

TABLE 4

Cross-Sectional Outcome Correlates of Wave 3
Situational Performance Constraints

Variable	r
Supervisory Performance Rating	-.28***
Self-Appraisal Rating	-.02
Job satisfaction	-.18
Organizational commitment	-.26**
Intent to quit	.19

** p < .01 *** p < .001

tion, and the intent to quit measure were not significantly correlated with the constraints.

Three of the six outcome variables studied failed in all cross-sectional analyses to show relationships with situational performance constraints. The self-appraisals, job satisfaction, and intent to quit all failed to show significant correlations with the constraints variable measured concomitantly in each respective wave. The two remaining variables with significant r 's did not show entirely consistent relationships across all three waves. A significant relationship between organizational commitment and constraints, only showed up in the Wave 2 data. Comparable correlations in Wave 1 and Wave 3 were nonsignificant. The only replicated constraints - outcome relationship was that for the supervisory appraisals with significant r 's occurring in Wave 1 and Wave 3.

Longitudinal Correlates of Situational Constraints

This study's longitudinal analyses compared constraints measures from previous waves with the outcome variables of subsequent waves. The constraints variable obtained from initial Wave 1 data was compared with the outcome variables measured from data collected six months later in Wave 2 and fourteen months later in Wave 3. The constraints variable obtained from Wave 2 data was similarly compared with outcome variables measured from data collected eight months later in Wave 3.

TABLE 5

Longitudinal Prediction of Wave 2 Outcomes Using
Wave 1 Situational Performance Constraints

Variable	r
Supervisory Performance Rating	-.22**
Self-Appraisal Rating	-.03
Job satisfaction	-.12
Organizational commitment	-.16
Intent to quit	.06

** $p < .01$

Longitudinal prediction of Wave 2 data outcomes using Wave 1 constraint variables are shown in Table 5. A significant correlation ($r = -.22$, $p < .01$) was found between the performance constraint variable and the supervisory performance rating. This relationship implied that lower performance might be related to greater situational constraints experienced in a prior period. There were no other significant correlations in this analysis.

Table 6 shows the 14-month longitudinal predictions of Wave 3 outcome measures by Wave 1 situational constraints. The situational constraints measures failed to significantly predict performance criteria, affective variables, or withdrawal plans over the prediction interval.

Longitudinal correlations between Wave 3 outcome measures and the situational performance constraints measured in Wave 2 are shown in Table 7. Wave 3 organizational commitment ratings were significantly predicted by Wave 2 constraint ratings ($r = -.23$, $p < .05$). No other significant correlations were observed in this analysis.

Evaluation of Hypothesis 1

Findings pertinent to this hypothesis are reported in Tables 2 through 4. This hypothesis predicted that situational performance constraints would be significantly correlated with measures of employee performance during each of three waves of data.

TABLE 6

Longitudinal Prediction of Wave 3 Outcomes Using
Wave 1 Situational Performance Constraints

Variable	r
Supervisory Performance Rating	-.10
Self-Appraisal Rating	-.11
Job satisfaction	-.01
Organizational commitment	-.14
Intent to quit	.02

TABLE 7
Longitudinal Prediction of Wave 3 Outcomes Using
Wave 2 Situational Performance Constraints

Variable	r
Supervisory Performance Rating	-.06
Self-Appraisal Rating	-.18
Job satisfaction	-.02
Organizational commitment	-.23*
Intent to quit	.15

* $p < .05$

In the results previously discussed, situational performance constraints were significantly correlated with the supervisory performance ratings in two cross-sectional analyses (i.e. Waves 1 and 3). However, the self-ratings of performance were not correlated with the situational performance constraints in any of the three waves. Based on these results, Hypothesis 1 received limited support.

Evaluation of Hypothesis 2

Results pertaining to this hypothesis are shown in Tables 2 through 4. This hypothesis stated that situational performance constraints would be significantly correlated with measures of work attitudes during each wave.

Organizational commitment was found to be significantly correlated with situational constraints only in Wave 3. In each of the three waves, situational performance constraints were not correlated with measures of job satisfaction. Based on these findings, Hypothesis 2 received limited support.

Evaluation of Hypothesis 3

Tables 2 through 4 are again used to evaluate this hypothesis. The third hypothesis predicted that situational performance constraints would be significantly correlated with a measure of behavioral intentions during each wave of data. The intent to quit variable was not significantly correlated with the situational performance constraints

measured in any of the three waves. Based on these results, Hypothesis 3 was not supported.

Evaluation of Hypothesis 4

Findings pertaining to this hypothesis are displayed in Tables 5 through 7. This final hypothesis stated that situational constraint ratings collected during a prior wave of data will significantly predict measures of (1) job performance; (2) work attitudes; and (3) behavioral intentions to quit collected in subsequent waves of data.

The predicted longitudinal relationships were evident in only two instances out of fifteen analyses. The supervisory performance rating measured in Wave 2 was significantly predicted by situational performance constraints measured in Wave 1. In addition, the Wave 3 organizational commitment measure was significantly correlated with constraints measured in Wave 2. Because the results were neither plentiful nor consistent across any variable, Hypothesis 4 was not supported.

IV. Discussion, Conclusions, and Recommendations

Since the effects of situational performance constraints on job performance were first demonstrated in a laboratory setting by Peters et al. (1980), the effects of situational constraints upon work performance have had limited play in field settings. Laboratory studies clearly indicated that inhibiting situational constraints were related to lower job performance. Field studies in both private and federal sectors have not shown consistent results. In both sectors, significant relationships have and have not been found between constraints and job performance (e.g. O'Connor, Peters et al., 1984; Steel & Mento, 1986a; O'Connor, Eulberg et al., 1984; Olson et al., 1986).

This study produced inconsistent relationships between the situational constraint measures and the two job performance measures. Like the public sector study by Steel and Mento (1986b), this study found no significant relationship between situational constraints and self-appraisal ratings. Significant relationships, however, were found between constraints and supervisory performance ratings. These findings in the federal sector parallel weak constraints - performance relationships observed by O'Connor, Eulberg et al. (1984) for Air Force enlisted personnel. This study's findings directly contrast with two public sector studies for Army personnel. Olson and Borman (1985) found sig-

nificant relationships between environmental factors (i.e. constraints) and performance for Army enlisted personnel. Similarly, Olson et al. (1986) found environmental - performance relationships in a sample of Army personnel from nine different occupational specialties.

The findings in this study also do not agree with findings from studies in the private sector. Like this study, Steel and Mento (1986a) and Steel et al. (1987) both used supervisory performance ratings and self-appraisal ratings as measures of performance. These two private sector studies, however, found significant constraints - performance relationships with both performance measures.

When this and previous studies are viewed together, a general pattern can be seen. Private sector field studies support the constraint - performance relationship. The relationship is not as clearly supported in the public sector. The findings of this study add to the mounting evidence of weak or nonexistent constraints - performance relationships in the public sector.

Peters et al. (1985) found the constraints - affective measures relationship to be consistent from study to study. Most studies found higher job satisfaction among groups with lower performance constraints. This study measured job satisfaction and organizational commitment. The findings of this study directly contrast with earlier studies (Peters et al., 1985) by showing no significant relationship between job satisfaction and constraints in any of the three waves

of data. Previous studies in the public sector have shown significant negative relationships between constraints and job satisfaction (O'Connor, Eulberg et al., 1984; Steel & Mento, 1986b). Additionally, O'Connor, Eulberg et al. (1984) found frustration higher among Air Force personnel in work environments where higher performance constraints were present.

Significant constraints - affective measures relationships were also previously found in the private sector. O'Connor et al. (1982) and O'Conner, Peters et al. (1984) found higher frustration among groups working in higher constrained environments. As in the public sector, O'Connor et al. (1982) also found a greater level of dissatisfaction associated with constraints. In addition to job satisfaction, this study examined the relationship between situational performance constraints and organizational commitment. The constraints - commitment relationship was found to be significant in only one wave of data. Overall, this study did not observe a conclusive constraints - affective measures relationship. This study's finding of a weak constraints - affective measures relationship contrasts sharply with previous findings in both the public and private sector.

The results of this study concerning the relationship between the employees' intent to quit and situational performance constraints agree with other federal sector studies (O'Connor, Eulberg et al., 1984; Steel & Mento,

1986b). The private sector study by O'Connor, Peters et al. (1984) found only a weak relationship between turnover and constraints. This study adds to the evidence that no significant connection exists between situational constraints and behavioral intentions to quit in either public or private sectors.

A secondary objective of this study was to determine if predictive relationships pertain over time for situational constraints and outcomes over a fourteen-month period. Even though this study found two occurrences of significant predictive relationships, the constraint variables failed to predict the majority of subsequent outcome measures. The longitudinal results do not necessarily rule out the general predictive value of situational constraints in all cases. The lack of performance predictability by situational constraints may have been the result of this study's methodological limitations.

One possible explanation for many of the differences between studies in this literature may be data source bias. Data source bias occurs when measures are spuriously correlated because responses to them were obtained from a common data source (e.g., the same individual). Response consistency bias is a well known example. The present study had each employee's immediate supervisor provide the constraint rating. Since he/she also supplied the supervisory performance ratings, the situational constraints variable and the supervisory rating were obtained from the

same source. Consequently, data source bias may account for the significant relationship between the two variables. In contrast, the self-appraisals were not contaminated by data source bias. Consequently, the correlation between the self-appraisal rating and the situational constraint variable may be a better indicator of true constraints - performance relationships than the correlation summarizing supervisory rating - situational constraints relationships. Two previous private sector studies (Steel & Mento, 1986a; Steel et al., 1987) also controlled for data source bias. These two studies found larger performance - constraint relationships when both variables shared a common source than when each variable came from a separate data source. The findings in this study are easily interpreted within a data source bias framework. They also seem to suggest that there is a lack of direct influence of constraints on job performance in the federal sector (O'Connor, Eulberg, et al., 1984; Steel & Mento, 1986b).

Unlike the majority of previous studies (e.g., O'Connor et al., 1984) data source bias was controlled in the present study's analysis of constraints - affective measures relationships. While supervisor's provided the constraints rating, the employees generated the affective variables. Although data source bias was controlled in this study, previous studies (excluding Steel & Mento, 1986b) in both private and public sectors failed to include this control. Previous studies (O'Connor et al., 1982; O'Connor, Peters et

al., 1984; O'Connor, Eulberg et al., 1984) have almost universally found significant constraints - attitudinal relationships. The present study did not. One is compelled to ask, "Did the uncontrolled data source bias present in previous research contribute to the frequency of significant attitudinal - constraints correlations?"

Conclusions and Recommendations

The primary intent of this research was to investigate the relationships between situational constraint measures and (1) job performance; (2) work attitudes; and (3) withdrawal intentions for a sample of United States Mint employees. The reason for this examination was to further the research on these relationships in the federal sector. Previous research in the public sector was limited to military samples. This study broadened the scope of public sector research concerning constraints - performance relationships into the nonmilitary arena. This study also sought to comply with the recommendations of previous studies by examining these relationships for new and different occupational groups.

The present study was not without limitations. One limitation stemmed from the responses to the constraints measure. Peters et al. (1985) discussed the absolute magnitudes of the constraint ratings as a potential explanation for the nonsignificant and weak constraints relationships found in field studies. The severity of the con-

straints in field research has been much lower than that created in the laboratory. Peters et al. (1985) concluded that constraints had little impact on performance and withdrawal in low severity constraint settings. The situational constraint ratings in this study were comparatively low, in an absolute sense. The relatively low constraint work environment may have contributed to the weak constraint relationships found in this study.

Another limitation was introduced by controlling for data source bias. This study obtained measures of situational constraints from supervisory personnel. Although the supervisors' constraint ratings may have been an honest reflection of the true work environment, the Mint employees may have perceived their environments differently. Peters et al. (1985) stated that when perceptual data is relied upon, variance due to the situation cannot be distinguished from variance due to personal factors of the perceiver. One possible improvement in the measurement of situational constraints may be made by changing the respondents. The constraint ratings could be supplied by a group of supervisors or employees separate from those employees or supervisors responding on other measures, or objective constraints measures could be employed. This technique may control data source bias as well as perceiver variation.

Although this study found little evidence to support its hypotheses, this study added to the research on situational performance constraints in field settings. This

study agreed with previous federal sector studies in showing that situational performance constraints do not strongly affect work performance in government organizations. Affective responses and behavioral intentions were also found to not be materially affected by constraints.

One methodological advance of this study over previous studies is its longitudinal nature. Previously published articles in the situational constraints literature have evaluated only cross-sectional relationships between constraints and outcome variables. While this study's longitudinal data revealed little predictability of performance by constraints, this study's longitudinal design should be repeated. Additional field research using longitudinal designs would allow researchers to draw inferences concerning the causal effects of constraints on subsequent outcome measures.

Although compelling data are lacking, it is likely that constraints affect employees even though their performance may not greatly diminish. Constraints may affect an employee's job performance and attitudes in ways not measured by this study. Employees may simply adjust to constraints without reducing their measurable output, but they may still be affected detrimentally by the constraints. For example, they may undergo greater amounts of stress in the conduct of their jobs.

Future research should continue investigating the relationships between constraints and performance and

affective measures in different work settings. In addition, studies in this area should include longitudinal analyses of these relationships. Future research should also include multiple measures of the variables (i.e. hard measures) to ensure data source bias is controlled.

Appendix A: Situational Constraints Items

- 1 = Never
- 2 = Very Rarely
- 3 = Rarely
- 4 = Sometimes
- 5 = Often
- 6 = Very Often
- 7 = Always

1. Job Induced Constraints

Def: Factors in the make-up of the job itself (e.g., assembly line paced work) that determine levels of performance.

2. Interpersonal or Social Obstacles

Def: Represents the quality of interpersonal relationships (e.g., communication climate, cooperation) among individuals who interact with the employee in the course of his/her work.

3. Environmental Obstacles

Def: Factors in the physical job environment (e.g., excessive noise or heat) and in the geographical locale of the work (e.g., sales potential) that effect job performance.

4. Administrative of Policy Constraints

Def: Rules, regulations, and requirements imposed upon an individual by the organization or governmental agencies that impede the employee's job performance to a greater extent than employees doing comparable work.

Appendix B: Supervisor's Performance Rating Items

- 1 = Far Worse
- 2 = Much Worse
- 3 = Slightly Worse
- 4 = About Average
- 5 = Slightly Better
- 6 = Much Better
- 7 = Far Better

1. Quantity of Output

Def: The productivity of an employee in terms of units of work produced or services rendered.

2. Quality of Work

Def: The degree to which work products are free from error and/or conform to standards and specifications.

3. Efficiency of Work

Def: The degree to which resources (e.g., money, materials, personnel) are used to their maximum capacity and waste is kept to a minimum.

4. Problem-Solving Capacity

Def: Represents the ability of an employee to anticipate problems that may come up and either prevent them or minimize their effects upon the operations of the work unit.

5. Adaptability/Flexibility

Def: Represents the ability of an employee to adjust to special circumstances (e.g., "crash projects" and sudden schedule changes) and perform under less than optimal conditions.

Appendix C: Self-appraisal of Performance Items

- 1 = Far Worse
- 2 = Much Worse
- 3 = Slightly Worse
- 4 = About Average
- 5 = Slightly Better
- 6 = Much Better
- 7 = Far Better

1. Compared with other employees doing similar work, your supervisor considers the quantity of the work you produce to be:
2. Compared with other employees doing similar work, your supervisor considers the quality of the work you produce to be:
3. Compared with other employees performing similar work, your supervisor believes the efficiency of your use of available resources (money, materials, personnel) in producing a work product is:
4. Compared with other employees performing similar work, your supervisor considers your ability in anticipating problems and either preventing or minimizing their effects to be:
5. Compared with other employees performing similar work, your supervisor believes your adaptability/flexibility in handling high-priority work (e.g., 'crash projects' and sudden schedule changes) is:

Appendix D: Job Satisfaction Items

- 1 = Delighted
- 2 = Pleased
- 3 = Mostly satisfied
- 4 = Mixed (about equally satisfied and dissatisfied)
- 5 = Mostly dissatisfied
- 6 = Unhappy
- 7 = Terrible

1. How do you feel about your job?
2. How do you feel about the people you work with--your co-workers?
3. How do you feel about the work you do on your job--the work itself?
4. What is it like where you work--the physical surroundings, the hours, the amount of work you are asked to do?
5. How do you feel about what you have available for doing your job--I mean equipment, information, good supervision, and so on?

Appendix E: Organizational Commitment Items

- 1 = Means you strongly disagree with the statement.
- 2 = Means you moderately disagree with the statement.
- 3 = Means you slightly disagree with the statement.
- 4 = Means you neither agree nor disagree with the statement.
- 5 = Means you slightly agree with the statement.
- 6 = Means you moderately agree with the statement.
- 7 = Means you strongly agree with the statement.

- 1. I am willing to put in a great deal of effort beyond that normally expected in order to help this organization be successful.
- 2. I talk up this organization to my friends as a great organization to work for.
- 3. I feel very little loyalty to this organization.
- 4. I would accept almost any type job assignment in order to keep working for this organization.
- 5. I find that my values and the organization's values are very similar.
- 6. I am proud to tell others that I am part of this organization.
- 7. I could just as well be working for a different organization as long as the type of work was similar.
- 8. This organization really inspires the very best in me in the way of job performance.
- 9. It would take very little chance in my present circumstances to cause me to leave this organization.

10. I am extremely glad that I chose this organization to work for over others I was considering at the time I joined.
11. There's not too much to be gained by sticking with this organization indefinitely.
12. Often, I find it difficult to agree with this organization's policies on important matters relating to its employee.
13. I really care about the fate of this organization.
14. For me this is the best of all possible organizations for which to work.
15. Deciding to work for this organization was a definite mistake on my part.

Appendix F: Intention to Quit Item

Within the coming year, if I have my own way:

- 1 = I definitely intend to remain in federal service.
- 2 = I probably will remain in federal service.
- 3 = I have not decided whether I will remain in federal service.
- 4 = I probably will not remain in federal service.
- 5 = I definitely intend to separate from federal service.

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Captain Mark S. Richardson was born on 17 October 1957 in St. Louis, Missouri. He graduated from high school in 1976 and attended Parks College of St. Louis University from which he received the degree of Bachelor of Science in Aeronautics in December 1978. Upon graduation, he received a commission in the USAF through the ROTC program. He was employed as an flight instructor for Parks College of St. Louis University, Cahokia, Illinois, until called to active duty in April 1979. He served as a Minuteman ICBM crew member and instructor in the 321 Strategic Missile Wing, Grand Forks AFB, North Dakota, until March 1983. He was then assigned to the 4315th Combat Crew Training Squadron, Vandenberg AFB, California, and served as a courseware developer, an academic instructor, and a training science instructor until entering the School of Systems and Logistics, Air Force Institute of Technology, in May 1986.

Permanent address: 6454 Bradley

St. Louis, Missouri 63139

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ABSTRACT

This research was conducted to determine if there were any significant relationships between concomitant measures of situational constraints and (1) job performance; (2) work attitudes; and (3) behavioral intentions to quit for a sample of employees from a United States Mint. This research also investigated predictive relationships between situational constraints and outcome measures over a fourteen-month period. Survey and performance appraisal data were collected from a sample of 260 United States Federal Mint employees in three waves: Wave 1 during November 1983; Wave 2 at the end of May 1984; and Wave 3 during January 1985.

This study found no significant relationships between situational constraints and self-appraisal ratings. Significant relationships, however, were found between constraints and supervisory performance ratings. Overall, the study did not observe a conclusive constraints - affective measures relationship. No significant connection between situational constraints and behavioral intentions to quit were found in the study. While this study's longitudinal data revealed little evidence of longitudinal predictability of performance by constraints, the author recommends the study's longitudinal design be used in future studies. The longitudinal design would enable researchers to draw inferences concerning the causal effects of constraints on subsequent outcome measures. *Thompson*

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